

Double Glass Installation Introduction

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ALMADEN CENTRAL LAB. (Province key LIGHT & ELECTRICITY Lab.)

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1. GENERAL INFORMATION

1.1. OVERVIEW

Thanks for your choice to use our double glass solar modules from Changzhou Almaden Co.,Ltd (hereinafter “Almaden”). To install the solar module correctly and obtain the smooth and stable current, please read the installation manual carefully prior to the module installation.

1.2. APPLICATION PRODUCTS

This manual can be used for the products below:

SEAP60 series、SEAM60 series、SEAP72 series、SEAM72 series

1.3. SAFETY PRECAUTIONS

- 1) Potentially lethal DC voltages can be generated whenever PV Modules are exposed to a light source therefore, avoid contact with electrically active parts and be sure to isolate live circuits before attempting to make or break any connections.
- 2) Do NOT use mirrors or any lens concentrate sunlight on the double glass modules
- 3) Front and back glass can protect double glass module, if some breakage happened to double glass module, the broken module must be removed immediately.
- 4) Double glass module current and voltage may be different from our parameters listed in our label in the common outdoor environment, because our parameters comes under Standard Test Condition. When determining the rated voltage, conduct current ratings, fuse sizes and size of controls which is related to the double glass output, please set the value with 125% times according to the short current and open circuit voltage marked in the label of double glass module.
- 5) Nontransparent materials can be used to cover the module surface to decrease risks of electric shock and fire. Only authorized and trained personnel should have access to these module installation and maintain.
- 6) Double Glass PV System configuration should follow the battery manufacture suggestions when using storage system.
- 7) DO NOT replace parts of or all of the rooftop and wall materials by double glass modules.
- 8) DO NOT touch any electric parts of double glass module with your hands. All the electric connection should be implemented using insulation tools.

- 9) DO NOT pull down any parts of double glass module.
- 10) Please read all the installation manual before installation and maintaining.
- 11) NO NOT lift module up by using the cable of Junction BOX.
- 12) Please make sure all the double glass system should be connected to the ground according to the international Electrotechnical Commission standards or other international standards, or local special standards.
- 13) Be careful with modules when open the carton after shipping to the destination.
- 14) DO NOT stand or walk on the top of module, thus can be harmful to module, and high risk for people.
- 15) Same type module can be connected in series.
- 16) Severe shake may cause damage of module, make sure where will not severe shake when transportation.
- 17) DO NOT use corrosive chemical solution to wipe double glass modules.
- 18) Do NOT shut off the module connections when the load is working.

2. INSTALLATION INSTRUCTIONS

2.1. INSTALLATION SAFETY

- 1) Wear protective insulation gloves, and insulation shoes.
- 2) Use the professional tools when installation
- 3) Open module cartons just before the installation.
- 4) Try to avoid touching double glass module without necessary.
- 5) DO NOT install solar modules in rainy, snow or big wind days.
- 6) If the terminals are wet, do not do the installation.
- 7) To install modules with insulation and dry tools.
- 8) Handle all the things carefully including modules and tools.
- 9) Make sure no gas can be fired near the location.
- 10) Connect positive connector with other module's negative connector, check all of the connections to make sure all the connection is correct and safe.
- 11) DO NOT touch male or female connector with bare hands.
- 12) DO NOT put heavy things or strength on the double glass module.
- 13) DO NOT strike modules with any objects, thus may cause micro-cracks in cells.
- 14) DO NOT use rough cloth to wipe module, which may cause snails on the modules.

2.2. INSTALLATION ENVIRONMENT

2.2.1 ENVIRONMENT CONDITIONS

- ALMADEN double glass module should be installed under the conditions below: Ambient temperature: -40°C to +40°C.
- Operating temperature: -40°C to +85°C
- Storage temperature: -20°C to +40°C
- Humidity: < 85%RH
- Mechanical Load Pressure: 5400Pa (550 Kg/m²) Max from the front side (snow) 2400Pa (wind) from the rear

NOTE:

- The mechanical load bearing is dependent upon the mounting methods used and failure to follow the instructions of this manual may result in different capabilities to withstand snow and wind loads. The system installer must ensure that the installation methods used meet these requirements and any local codes and regulations.
- The junction box side is the rear side, the other side is the front side.

2.2.2 INSTALLATION SITE

- 1) All modules should ideally be installed in a location where they can receive maximum sunlight through the year.
- 2) When choosing a site, shall avoid trees, buildings or obstructions which could cast shadows on the solar modules.
- 3) DO NOT install modules under corrosive conditions, such as coast line or anywhere easily damaged by the severe natural disasters.
- 4) DO NOT install modules in the sites which may cause module immersed in water or exposed to springs.
- 5) DO NOT install module near the fire or combustible.
- 6) Module edge and wall or rooftop should have no less than 115mm distance to protect the wirings and make sure the air circulation behind module can be smooth.

2.2.3 INSTALLATION TILT ANGLE

- 1) The modules connected in series should be installed at same orientation and angle. Different orientation or angle may cause loss of power output due to differences in the amount of sunlight irradiance.

2) Almaden module produce the optimum power when they are installed directly towards the sun. If modules are installed with a fixed structure, it is better to find a proper angle to get the maximum power output for each year. PV modules optimum angle sometimes equals to the location’s latitude. Please check the Fig 1 for explain.

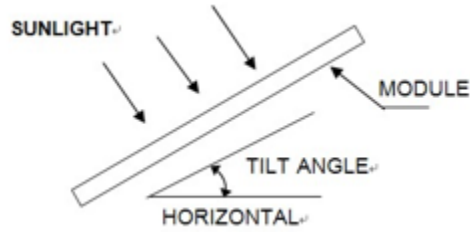


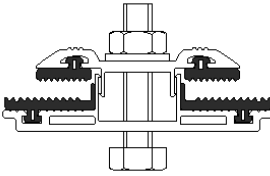
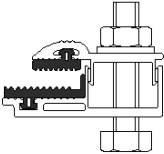


Fig1.Optimum angle


2.3. INSTALLATION METHOD INTRODUCTION

2.3.1 MAIN PARTS AND FUNCTIONS

Please refer to the Tab1 when installation

TAB1: clamps & parts introduction.



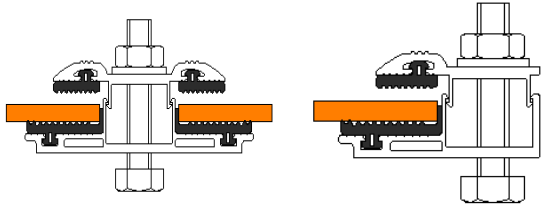
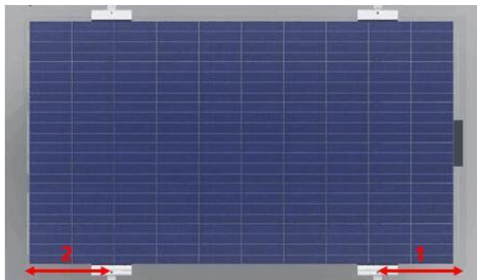
Nos	Items	Pic	Description
1	Middle Clamp		middle module installation
2	End Clamp		Edge installation
3	EPDM		To protect Modules
4	Structure		Support module and clamp installation

5	Screw		Fasten Module with clamps
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2.3.2 INSTALLATION STEPS

Please follow installation steps in Tab2.

Tab2: Installation Steps

Nos	Description	Pic
1	<p>Installation Support structure</p> <ul style="list-style-type: none"> ● Make sure the module type and designed load. ● Refer to Tab4 to choose the right installation method. ● Refer to Tab3 to choose the distance between two support structure 	
2	<p>Clamps Installation</p> <ul style="list-style-type: none"> ● No need to fasten clamps in this step ● Use M8 type screw ● Note the EPDM should not falling down. ● To choose clamps with Tab 4. 	
3	<p>Module Installation</p> <ul style="list-style-type: none"> ● Put Module inside of clamps ● Take care of module when installation. 	
4	<p>Adjust distance</p> <ul style="list-style-type: none"> ● To adjust the distance of 1&2 in the pic. ● Make sure the distance of 1& 2 are the same. 	

5	<p>Fasten Clamps</p> <ul style="list-style-type: none"> ● Use the spanner to fasten all of clamps. ● The torque should follow Tab 3. 	
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2.3.3 INSTALLATION PARAMETERS

Tab 3: Double glass installation parameters

Double glass module installation parameters		
Module Type	SAEP60/SEAM60	SAEP72/SEAM72
Module Dimension(mm)	1662*990*5	1980*990*5
Installation Distance 1 (mm)	280~380	410~430
Installation Distance 2(mm)	280~380	410~430
Distance between two support structure(mm)	902~1102	1120~1160
The torque (N*M)	15~18	15~18

2.3.4 INSTALLATION METHOD

Please choose installation method according to your design in Tab 4.

Tab 4: Installation method

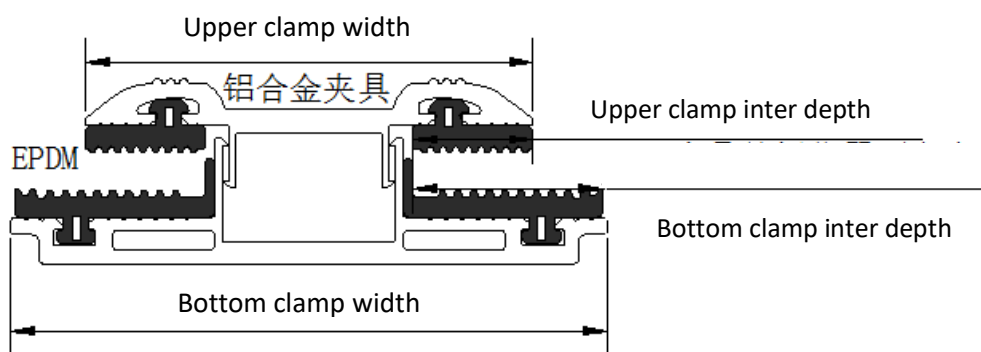
Installation Method			
Module Type	Load capacity	Clamp Length	Qty of Support structure & clamps
SAEP60/SEAM60	+2400Pa/-2400Pa	100mm	2 support structure & 4 clamps
	+3600Pa/-2400Pa	120mm	2 support structure & 4 clamps
	+3600Pa/-3600Pa	150mm	2 support structure & 4 clamps
	+5400Pa/-2400Pa	150mm	2 support structure & 4 clamps
SAEP72/SEAM72	+2400Pa/-2400Pa	180mm	2 support structure & 4 clamps
	+3600Pa/-2400Pa	180mm	2 support structure & 4 clamps

	+3600Pa/-3600Pa	200mm	2 support structure & 4 clamps
	+5400Pa/-2400Pa	200mm	2 support structure & 4 clamps

2.3.5 CLAMP DETAILS

Usually suitable clamps cross section and dimension can improve solar module mechanical load capacity. Please check the clamps cross section pic in Fig 2 and Tab 5. EPDM used in the clamps should protect module from damages and should not have reactions with other materials and self-pollutions. Also EPDM should have the same durability with double glass modules. Please check the parameters in Tab 6. The support structure parameter listed in Tab 7.

1) Clamp cross section



2) Clamps cross section Clamps cross section dimension

Tab 5. Clamps cross section dimension

Clamps cross section dimension		
NO	Items	Standards
1	Upper clamp width	≥58mm
2	Bottom clamp width	≥76mm
3	Upper clamp inter depth	≥15mm
4	Bottom clamp inter depth	≥25mm
5	Clamp Thickness	≥1mm
6	EPDM Thickness	≥3mm

3) EPDM standard parameters

Tab6. EPDM standard parameters

EPDM standard parameters(special for PV solar modules)		
NO	Items	Specification
1	Appearance	Smooth, no twister, bubble, crack, and other defects
2	Shore Hardness	65±5/sha
3	Tensile strength	≥10.5/Mpa
4	Elongation at breakage	≥300/%
5	Contact Pollution	No pollution

4) Support structure parameters

Tab7. Support Structure parameters

Support Structure standard parameters		
NO	Items	Specification
1	Aluminum No.	6005or6063
2	Tensile Strength (σ_b)	≥160/Mpa
3	YS ($\sigma_{p0.2}$)	≥110/Mpa
4	Elongation Ratio (n_{δ})	≥7/%

3. CONNECTIONS

- 1) Carefully read this manual before starting Installation. Customers can connect modules in series or parallel according to system capacity, current and voltage requirement.
- 2) All modules connected in series must have the same current level, the overall voltage of one string should never exceed the limit of system voltage. Quantity of modules for one string should be designed by the system capacity, inverter and environment.
- 3) Fuse current capacity can be found in module labels for each string. The rated fuse current is the highest reverse current which module can suffer. Please choose fuse properly according to the local standards and the rated fuse current.
- 4) Please choose the cable according to the system capacity, current, voltage, and the international standards.
- 5) Please also follow the locations' electric standards to do the connections.

- 6) There are 3 bypass diodes in one module. Make sure installation is correct, otherwise bypass diodes, cable, and junction box may be damaged.

4. MAINTENANCE AND CARE

Even a well-designed system also require some maintenance to protect PV system operate well with high efficiency.

Please at least follow the details below to do site maintenance at least.

4.1. APPEARANCE INSPECTION

Carefully Inspect module damages below:

- 1) Protective Angle is for protection when transportation, we suggest to not remove them, but no control of this part.
- 2) Make sure solar module do not damage.
- 3) Make sure no sharp obstacles on the module surface.
- 4) Check whether module are shaded by obstacles.
- 5) Check there is any corrosive situation happened to the cell busbar. ◦
- 6) Inspect all the screws between modules and structures, and fasten the screws in time.

4.2. CLEAN

- 1) Sand and dust will cause module power decrease, so it is particularly important to clean modules regularly (clean time should be decided by the location situation). When cleaning the module, use a soft cloth together with a mild detergent and clean water. Not suggest to use mineral water to clean modules to avoid leaving some stains on the surface of modules.
- 2) DO NOT use rough cloth to clean modules.
- 3) Recommend to clean modules in the early morning or late afternoon when there is no much strong irradiance, especially for high temperature area.
- 4) DO NOT clean modules with glass damage or exposed wire line. These modules are high electric shock risk.

4.3. CONNECTORS AND WIRE INSPECTION

Recommend to do pre-inspection every six month:

- 1) Inspect the potting in junction Box and make sure no crack or gaps.

- 2) Inspect aging situation of modules. Including animals destroy, climate affection, connection between connectors, corrosive situations in the module or structures and grounding.

5. ELECTRICAL PROPERTIES

Double Glass Module power output is tested under standard test conditions, that is to say sun irradiance: 1000 W/m², AM1.5 and environment temperature 25°C. Sometimes, module power can be much higher or lower than the STC power output. When determining the rated voltage, conduct current ratings, fuse sizes and size of controls which is related to the double glass output, please set the value with 1.25 times of the short current and open circuit voltage marked in the label of double glass module.

Download the according electrical data from our website: www.czamd.com

6. DISCLAIMER OF LIABILITY

- 1) The purpose of this doc is to provide clear instructions on how to install Almaden photovoltaic modules, in order to use them as easily and safety as possible.
- 2) The installation, handling and use of Almden double glass series modules are beyond company control, accordingly, Almaden does not assume responsibility for loss, damage, injury or expense resulting from improper installation, handling, use or maintenance.
- 3) Almaden assumes no responsibility for any infringement of patents or other rights of third parties that may result from use of the module. No license is granted by implication or under any patent or patent rights.
- 4) Specifications included in this manual are subject to change without prior notice.

7. REVISED RECORDS